

REMARKS

The specification has been amended to identify the examples originally identified as Examples 7 to 16 as Comparative Examples 1 to 10. Original Comparative Examples 1 to 7 have been renumbered as Comparative Examples 11 to 17. Table 1 has been amended for consistency with the changes to the example numbers. Original Examples 7 to 10 have been identified as comparative examples to reflect the fact that the heat-sensitive recording materials of these examples have inferior properties as compared to the heat-sensitive recording materials of Examples 1 to 6 as described below.

In view of the extensive amendments to the specification, a substitute specification is being submitted herewith. A clean version and a marked up version are being submitted as per 37 C.F.R. § 1.125. No new matter has been added to the application.

claim 1 has been amended to recite a preferred heat-sensitive recording material of the present invention, claims 2, 3, 5 and 6 have been amended for consistency with the amendments to claim 1, and claims 4 and 7-15 have been cancelled. Support for the

amendments to the claims can be found on page 10, lines 5 to 6, and Example 6 and Table 2 ("ODII") of the specification.

As amended, claim 1 recites the embodiment of the heat-sensitive recording material of the present invention which comprises a support and a heat-sensitive recording layer formed on the support and containing a leuco dye and a developer; wherein

the developer is N-p-toluenesulfonyl-N'-3-(p-toluenesulfonyloxy)phenylurea, and

the heat-sensitive recording layer contains (a) at least one fluoran-based leuco dye having a melting point of 190 to 230°C or 3-di(n-butyl)amino-6-methyl-7-anilino-fluoran, and (b) at least one pigment selected from the group consisting of aluminum hydroxide, amorphous silica, kaolin and talc, said at least one pigment being used in an amount of 3 to 50 wt% based on the heat-sensitive recording layer.

The heat-sensitive recording material of the present invention particularly as recited in claim 1 exhibits excellent recording sensitivity, heat resistance, light resistance, water resistance, hot water background fogging resistance (hereinafter referred to as "hot water resistance") and the like. Referring to the data of

Table 1 as amended herein, it is seen that the heat-sensitive recording layer containing a specific amount of the specific pigment(s) of the present invention achieves a remarkable improvement in

(1) water resistance in recorded portion; and

(2) hot water resistance in unrecorded and recorded portions.

Particularly, the heat-sensitive recording layer of the present invention exhibits excellent hot water resistance and achieves extremely excellent effects in improving hot water resistance in unrecorded portions (i.e., the effect of improving resistance to background fogging caused by hot water). (Compare the results of the amended Comparative Examples 1 to 17 with those of Examples 1 to 6).

The hot water resistance of the heat-sensitive recording material of the present invention is particularly important. As described on page 10, lines 14-19, of the application, heat-sensitive recording materials exhibiting excellent hot water resistance achieve remarkable effects such that the recorded images formed thereon are legible even if they are contacted with hot water, hot coffee, hot tea, etc. Therefore, such materials can be

advantageously used for lottery tickets, horse race tickets, and the like. These properties of the heat-sensitive recording material claimed in the present application cannot be reasonably predicted from the prior art.

In order to improve the hot water resistance of a heat-sensitive recording material using N-p-toluenesulfonyl-N'-3-(p-toluenesulfonyloxy)-phenylurea as a developer, it was been found by the applicants to be important to use a specific leuco dye/dyes and a predetermined amount of a specific inorganic pigment/pigments (at least one selected from aluminum hydroxide, amorphous silica, kaolin, and talc) in the heat-sensitive recording layer. As shown by the data of amended Table 1, when a specific inorganic pigment as recited in the claims is used, heat-sensitive recording materials exhibiting excellent hot water resistance can be obtained. On the other hand, when calcium carbonate or magnesium carbonate is used as a pigment, heat-sensitive recording materials exhibiting only low hot water resistance can be obtained.

Referring now to the rejections in the Action of May 5, 2003, claims 1-18 are rejected under 35 U.S.C. §103(a) as being

unpatentable over the patent to Heneghan (WO 00/35679). Removal of this rejection is in order for the reasons explained below.

First, as described above, the heat-sensitive recording layer of the present invention is characterized in that a specific inorganic pigment of pigment(s) is (are) used in a specific amount. Heneghan discloses pigments, developers, and fluoran-based leuco dyes as components usable for a heat-sensitive recording layer. However, as pigments, Heneghan merely lists a plurality of organic and inorganic pigments (for example, on page 18, lines 24-26). Heneghan does not suggest any preference for the specific inorganic pigments used in the present invention as compared to calcium carbonate that, as shown by the data in the examples in the present application, results in low hot water resistance. Furthermore, in the examples of Heneghan, only calcium carbonate is employed (see, for example, Examples 1-49 in Heneghan). Heneghan nowhere discloses the feature of the present invention of the use of the specific inorganic pigment or pigments in a specific amount and, thus, does not enable a person of ordinary skill in the art to reasonably predict the properties of a heat-sensitive recording

material in which the heat-sensitive recording layer contains the specific pigment or pigments in the specific amount.

Taylor also fails to disclose or suggest the heat-sensitive recording material of the present invention as recited in the amended claims and the properties thereof.

Heneghan (and Taylor), therefore, fails to support a case of obviousness under 35 U.S.C. § 103(a) of the claims remaining in the application and removal of the 35 U.S.C. § 103(a) ground of rejection is in order.

Regarding the rejection under 35 U.S.C. § 112, an English language version of "JIS K 5101" is submitted herewith to overcome the rejection.

The foregoing is believed to be a complete and proper response to the Office Action dated May 5, 2003, and is believed to place this application in condition for allowance. If, however, minor issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of

PATENT APPLN. NO. 09/988,466
RESPONSE UNDER 37 C.F.R. §1.111

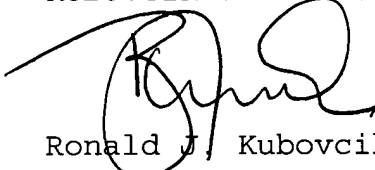
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time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,

KUBOVCIK & KUBOVCIK

A handwritten signature in black ink, appearing to read 'Ronald J. Kubovcik', is written over the printed name.

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Attachments: Substitute specification and marked up copy of the
 specification
 English language translation of JIS K 5101